a substantial resistive effect in the actuator system. In one embodiment a high K dielectric material is used, however, any satisfactory dielectric or insulating material can be used as insulator layer 64. By having a second capacitance in the actuator system, the capacitance across the fly height gap 72 can be maintained sufficiently high to generate an adequate electrostatic force while also keeping the voltage at the interface of second tunnel current.

Please replace the paragraph at page 9-11, page 10 line 19 with the following paragraph:

FIG. 4 is the equivalent circuit structure of the multi-layer electrode device 44. The fly height actuator 78 is powered through the fly height control voltage 71 via the multi-layer electrode device bond pad connection 48. The parasitic resistor R_P is representative of the multi-layer electrode device bond pad connection 48 resistance and other minor resistance present in the system. Resistor R_P has resistance from approximately 10 Ohms to a maximum of approximately 100 Ohms. The leakage resistor R_L is representative of resistance produced by second insulator layer 64. Resistor R_L has a resistance on the magnitude of mega-ohms or giga-ohms by making second insulator layer 64 of sufficient thickness. This can be seen generally with the equation

$$R_L = \rho T_2 / A_2 \qquad \text{Equation [1]}$$

where R_L is the resistance, ρ is the resistivity of second insulator layer 64 material, T_2 is the thickness of second insulator layer 64, and A_2 is the surface area of second insulator layer 64. In one embodiment, second insulator layer 64 has a thickness of 30 nm. Such high resistance will result in most current traveling through C_1 as shown by I_1. There will only be current on the order of nano-amps traveling through R_L as shown by I_2. The high resistance-low amp arrangement of the multi-layer electrode device 44 results in reduced leakage current which is one benefit of this system. C_1 is representative of the capacitance formed by second insulator layer 64 between first electrode layer 68 and second electrode layer 70. C_1 is made to have a capacitance on the order of pico-farads by maintaining the thickness of second insulator layer 64 relatively high, such as 30 nm in the embodiment described above. This can be seen generally with the equation

$$C_1 = K_1 \varepsilon A_1 / T_1 \qquad \text{Equation [2]}$$

where C_1 is the capacitance, K_1 is the dielectric constant of second insulator layer 64 material, ε is the permitivity of air, A_1 is the surface area of second insulator layer 64, and T_1 is the thickness of second insulator layer 64. The low capacitance of C_1 combined with most of the current I_1 of the system traveling through it results in rapid charge time. This is primarily due to the exclusion of any series resistance in the system which eliminates time dependant exponential RC charge rate. This can be seen generally from the equation

$$Q = CV(1 - e^{[-(t/RC)]}) \qquad \text{Equation [3]}$$

used for RC series circuits, where Q is the charge at C_1, C is the capacitance at C_1, V is the voltage at C_1, and t is the charge time. Rapid charge time of C_1 results in rapid response time of the fly height actuator 78 which is a second benefit of the system. C_2 is representative of the capacitance formed by third insulator layer 66 and the fly height 72 air gap between second electrode layer 70 and the magnetic disc 12. The capacitance of C_2 can be kept high by keeping third insulator layer 66 thin. This can be seen generally with the equation

$$C_2 = K_2 \varepsilon A_2 / (T_2 + K_2 d) \qquad \text{Equation [4]}$$

where C_2 is the capacitance, K_2 is the dielectric constant of third insulator layer 66 material, ε is the ~~permitivity~~ permittivity of air, A_2 is the surface area of third insulator layer 66, T_2 is the thickness of third insulator layer 66, and d is the fly height air gap 72. In one embodiment third insulator layer 66 has a thickness of 5 nm. By keeping C_2 high and C_1 low, the voltage at C_1 can be kept low. This can be seen generally from the equation

$$C_1 V_1 = C_2 V_2 \qquad \text{Equation [5]}$$

where C_1 is the capacitance at C_1, V_1 is the voltage at C_1, C_2 is the capacitance at C_2, V_2 is the voltage at C_2. This reduces field emission discharge which is a third benefit of this invention. C_2 is also representative of the action of the fly height actuator 78. R_0 is the leakage resistance of insulator layer 66. I_0 is representative of the leakage current across the fly height air gap 72. As currents I_1 and I_2 enter C_2 and R_0, the amount of I_0 leakage current generated depends on the fly height 72. At larger fly heights, I_0 will be negligible. I_0 increases as fly height 72 decreases. The resistance of R_0 helps limit tunneling current and field emission discharge. The thickness of third